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Research report

Influence of label information on dark chocolate acceptability[☆]

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ABSTRACT

The aim of the present work was to study how the information on product labels influences consumer expectations and their acceptance and purchase intention of dark chocolate. Six samples of dark chocolate, varying in brand (premium and store brand) and in type of product (regular dark chocolate, single cocoa origin dark chocolate and high percentage of cocoa dark chocolate), were evaluated by 109 consumers who scored their liking and purchase intention under three conditions: blind (only tasting the products), expected (observing product label information) and informed (tasting the products together with provision of the label information). In the expected condition, consumer liking was mainly affected by the brand. In the blind condition, differences in liking were due to the type of product; the samples with a high percentage of cocoa were those less preferred by consumers. Under the informed condition, liking of dark chocolates varied depending on both brand and type of product. Premium brand chocolates generated high consumer expectations of chocolate acceptability, which were fulfilled by the sensory characteristics of the products. Store brand chocolates created lower expectations, but when they were tasted they were as acceptable as premium chocolates. Claims of a high percentage of cocoa and single cocoa origin on labels did not generate higher expectations than regular dark chocolates.

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Introduction

During the development of food products, companies should make efforts to understand consumer preferences as well as their perception of sensory and non-sensory characteristics of foods in order to assure product success in the market (Moskowitz & Hartmann, 2008; Tuorila & Monteleone, 2009). In this regard, several investigations in recent decades have studied consumer attitudes and perceptions to food products to elucidate which factors interact with the consumer's response (Bolling Johansen, Naes, & Hersleth, 2010; Prescott & Bell, 1995; Rozin, 1996). Consumers evaluate their overall liking through their perception of the sensory characteristics of food products, and several lines of research have shown that the sensory properties of food are among the most important factors in consumer food choice. However, much research has shown that, in everyday life, consumer likes and food choices also depend on non-sensory attributes, such as information acquired about a product (brand, price or nutritional knowledge), attitudes and beliefs (such as convenience or health properties) or past experiences. For these reasons, these factors are becoming increasingly important for food companies (Costell,

Tarrega, & Bayarri, 2010; Jaeger, 2006; Sheperd, Sparks, Bellier, & Raats, 1991).

Despite influencing consumer likes and sensory perceptions, non-sensory attributes such as information, are also likely to affect consumer sensory and hedonic expectations (Sabbe, Verbeke, & Van Damme, 2009). Expectations affect people's everyday reactions and decisions both consciously and unconsciously (Deliza & MacFie, 1996). In food science, as proposed by Olson and Dover (1979), expectations can be defined as pretrial beliefs about a product. Usually, before consumers taste a particular food product, they have an idea of what its sensory characteristics might be (sensory expectations) and how much they will like or dislike it (hedonic expectations). These expectations are created by the consumers' previous experiences with the product, by the product itself, particularly its appearance, information on the label and packaging characteristics (Varela, Ares, Giménez, & Gámbaro, 2010). High expectations are likely to lead to consumer acceptance of the product, whereas low expectations will lead to product rejection (Cardello, 1994). Even though consumer expectations are high, a food product will not be accepted if consumers do not like the flavour or any other sensory product attributes (Bech-Larsen & Scholderer, 2007; Tuorila & Cardello, 2002; Verbeke, 2006). When the product is chosen and then tasted, the expected sensory and hedonic characteristics are compared with the real ones, leading to confirmation or disconfirmation (Deliza & MacFie, 1996). A mismatch between expected and actual sensory or hedonic characteristics of

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the product would lead to disconfirmation, which may be positive or negative depending on whether the product is better or worse than expected, respectively (Cardello, 1994). If negative disconfirmation occurs, the consumer will probably reject the product and not buy it again (Deliza & MacFie, 1996). Conversely if positive disconfirmation occurs, the consumer will probably accept the product and repeat consumption. Therefore, product satisfaction is achieved when it matches consumer expectations. Different models have been proposed to describe how disconfirmation created by expectations may influence product acceptability. Among them, the assimilation model occurs when product evaluation (sensory or hedonic) changes in the direction of expectation while the contrast model occurs when the product evaluation changes in the opposite direction of expectation, thus increasing the discrepancy between product evaluation and expectation. Those models have been described in previous research on different types of food product (Villegas, Carbonell, & Costell, 2008; Ares, Barreiro, Deliza, Giménez, & Gámbaro, 2010; Lange, Rousseau, & Issanchou, 1999; Varela et al., 2010). Therefore, the ability to establish expectations about a particular product becomes an essential strategy for the food industry in order to promote consumer sensory satisfaction (Deliza, Rosenthal, & Silva, 2003).

Several studies on different products have demonstrated that information can have a large impact on consumer expectations (Behrens, Villanueva, & da Silva, 2007; Vidigal, Minim, Carvalho, Milagres, & Gonçalves, in press; Villegas et al., 2008), and that brand, in particular, can be one of the non-sensory factors affecting consumer liking of products and food choice (Guinard, Bunsaku, & Schlich, 2001).

In the chocolate market, other product characteristics such as a high percentage of cocoa (70–85% or even 99%), single-origin chocolates made from beans from one country or region (Ghana, Ecuador or Venezuela) or a variety of exotic ingredients present in formulations (fruits, spices or liquor) are the strategies most often used to attract consumers attention (Afoakwa, 2010). The development of products with such claims can present good opportunities for confectionary manufacturers, whenever the products meet consumer expectations. So far, few studies in the literature have focused on the effect of product label information on consumer expectations, acceptance or purchase intention of dark chocolates.

The aim of the present work was to study the influence of brand and type of product information on acceptance and purchase intention of dark chocolates.

Materials and methods

Consumer sample

One-hundred and nine subjects, all regular consumers of dark chocolate, participated in the study. They were recruited by an advertisement at the university. Half of the consumers were students and university staff and the rest were contacted individually from a database of consumers unrelated with the university, who were contacted to attend the sessions. Participants ranged in age from 18 to 70 years (33% <30 years; 35% from 30 to 50 years and 32% >50 years) and were 40% men and 60% women. Thirty-five percent of participants consumed chocolate less than three times per week and 65% consumed chocolate more than three times per week. Also their interest and availability to participate in the study was considered for their recruitment.

Consumer test

Six commercial dark chocolates were evaluated in the present study, considering two brands (premium and store brand) and

three types of chocolate: one regular, one with a compositional claim (high percentage of cocoa) and one with an origin claim (Ecuador cocoa single origin) (Table 1). Samples were purchased from the local market and were stored at 12–15 °C before testing. All the evaluations were performed within the declared shelf-life period of each sample.

All consumers participated in the three evaluation conditions: blind, expected and informed as explained below. In the first session, only the samples were presented (blind condition, B) to consumers so that they could evaluate their overall acceptability and purchase intention. Overall acceptability of the samples was evaluated using a nine-point hedonic scale ranging from 1 ('dislike extremely') to 9 ('like extremely') and purchase intention evaluation was made with a five-point scale ranging from 1 ('definitively would not buy') to 5 ('definitively would buy').

In the second session, 1 month later, participants were provided with the image of the packaging of each product that contained information about the product type (regular dark chocolate, Ecuador cocoa dark chocolate and 85% cocoa dark chocolate) and the brand (premium and store brand) (Table 1). The subjects were asked to look at the package and to rate how acceptable they expected the product would be and their purchase intention (expected condition, E). After that, the subjects were given the packaging and the corresponding product to be tasted at the same time (informed condition, I). They rated both acceptability and purchase intention using the above mentioned scales.

Samples (portions 1 cm × 1 cm) were served at 15–20 °C in white plastic dishes; mineral water and crackers were provided for mouth rinsing. Samples and their packaging were identified with three-digit random codes. To avoid first-position distortions and possible carry-over effects, the presentation order followed a Williams design for six samples (MacFie, Bratchell, Greenhoff, & Vallis, 1989) within each of the three conditions, and they were presented monadically.

Data analysis

To study the effect of the brand and type of product a two way analysis of variance (brand and type of product) with interaction was carried out on liking data obtained in blind, expected and informed conditions. Significance of differences among mean values was calculated using Tukey's test. Significance was considered as 5% ($\alpha \leq 0.05$). The individual responses of consumers to each product under the blind, expected and informed condition were analysed by the Internal Preference Mapping methodology using a PCA on the correlation matrix of consumer individual liking data (MacFie & Thompson, 1998). The results were expressed as scatter plots of samples and individual consumers in relation to the first two principal dimensions. From purchase intention evaluation, the percentage of consumers rating the samples in each one of the five points of the scale was obtained (1 = definitively would not buy; 2 = probably would not buy; 3 = might buy; 4 = probably would buy and 5 = definitively would buy). Student's *t* tests ($p \leq 0.05$) were carried out to detect differences between expected and blind conditions (E–B), between informed and blind (I–B) and between informed and expected (I–E) conditions. All the analyses were performed using XLSTAT-Pro Version 2010 software (Addinsoft, Paris, France).

Results and discussion

Overall liking and purchase intention of dark chocolate samples

Expected condition

Expected liking scores ranged from 5.16 to 6.87 (Table 2). According to the results of the ANOVA only the knowledge of the brand had a significant effect on consumers expected liking scores

Table 1

Main characteristics of commercial chocolate samples.

Sample code	Brand	Type of product	Main ingredients declared on label	Energy value ^a (kcal)	Protein ^a (g)	Fat content, total ^a (g)	Saturated fat ^a (g)	Carbohydrate, total ^a (g)	Sugars ^a (g)	Dietary fibre ^a (g)
P1	Premium	Regular dark chocolate	Cocoa mass, sugar, cocoa butter, emulsifier: soya lecithin, vanilla flavourings	ND	ND	ND	ND	ND	ND	ND
P2	Premium	Ecuador cocoa dark chocolate	Cocoa mass, sugar, cocoa butter, emulsifier: soya lecithin, vanilla flavourings	ND	ND	ND	ND	ND	ND	ND
P3	Premium	85% Cocoa dark chocolate	Cocoa mass, low fat cocoa powder, cocoa butter, demerara sugar, natural Bourbon vanilla beans	530	11	46	28	19	14	ND
S1	Store-brand	Regular dark chocolate	Cocoa mass, sugar, cocoa butter, emulsifier: soya lecithin	521	7.2	30.3	19.2	50.1	46.6	ND
S2	Store-brand	Ecuador cocoa dark chocolate	Cocoa mass, sugar, cocoa butter, emulsifier: soya lecithin	528	7.5	30.6	19.6	49.8	46.6	9.8
S3	Store-brand	85% Cocoa dark chocolate	Cocoa mass, sugar, cocoa butter, flavourings	586	11.1	50.1	32.4	22.8	15.0	12.3

ND, not declared on label.

^a As declared on label (100 g of product).

(Table 3). Consumers' highest hedonic expectations were found for premium brand products (Table 2). Information about the type of product (regular, 85% cocoa and Ecuadorian cocoa origin) did not significantly affect consumer hedonic expectations. These results confirmed the importance of the brand in generating hedonic expectations among consumers, as previously observed by Varela et al. (2010) and Guinard et al. (2001) who studied the effect of brand information on acceptability of powdered beverages and in lager beers, respectively.

Expected purchase intention scores were also mainly affected by the chocolate brand. The percentage of consumers indicating that they would probably or definitively purchase the sample was considerably higher for premium brand samples (53–63%) than for the store brand samples (20–32%).

An internal preference map of consumer expected liking scores is shown in Fig. 1. The first two principal components (PC) explained 74.49% of the variability of the experimental data. PC1 clearly separated samples according to brand (premium samples on the right of PC1), while PC2 separated samples with a claim on the label of 85% cocoa (samples with 85% of cocoa on the bottom of PC2). Consumers were distributed throughout a semi-circle (Fig. 1), revealing heterogeneity in consumer expected preferences. A large group of consumers, represented on the right-hand side of PC1, preferred samples from the premium brand, whereas only a few consumers preferred store brand samples (located on the left-hand side of PC1). PC2 showed interesting information about the responses of consumers to the type of product, especially to label information about high cocoa percentage. Considering only the average values, no differences were observed due to the information about percentage of cocoa. However, a plot of the scores divided consumers into three groups with different responses to information about percentage of cocoa: consumers located at the bottom gave higher scores to samples where the label claimed 85% cocoa than to samples without this information, while those on the top gave lower scores when the label included information on 85% cocoa. For those located in the middle the 85% cocoa claim did not affect their expected liking scores so much.

Blind condition

Under the blind condition, liking scores varied greatly between samples, with values ranging from 3.83 to 6.87 (Table 2) suggesting that consumer response to the sensory characteristics of the chocolates was very different among samples. Here, scoring ranges

were wider and values lower than the liking scores obtained under the expected condition. In this case, brand had no significant effect on acceptability, whereas the type of product was found to be significant (Table 3). For both brands, differences were due to the type of product (Table 3). As shown in table 2 for both brands, the chocolates with 85% cocoa were those least acceptable to consumers (slightly and moderately disliked on a nine-point hedonic scale).

Regarding purchase intention based on the sensory properties of the chocolates more than 65% of consumers would not purchase samples with 85% cocoa (P3 and S3) while around 50% of consumers indicated that they probably or definitively would purchase regular and Ecuadorian samples from both brands.

An internal preference map of consumer overall liking scores for the blind condition is shown in Fig. 2. The first two principal components (PC) explained 79.9% of the variability of the experimental data. Under this condition, samples were separated in a different manner to that described for the expected condition above. The first PC clearly separates samples according to the type of product (samples with 85% cocoa on the left and the others on the right). Most of the participants (located to the right-hand side of PC1) preferred "regular dark chocolates" and "Ecuadorian dark chocolates", whereas a small group of consumers preferred "dark chocolates with high percentage cocoa" (observed on the left-hand side of PC1). Samples appeared to be clearly separated along PC2 according to the brand (premium samples on the top). However this component only explained 11.2% of total variability and most consumers are located in the middle of the plot, showing small differences in preference among samples of different brands. These results agreed with the non-significant effect found for brand when evaluating mean acceptance values.

Informed condition

Overall, informed liking scores ranged from 3.86 to 7.12 (Table 2). The differences among the samples in this tasting condition were more pronounced than those found in the blind condition. In this case, both brand and type of product significantly affected overall liking (Table 3). Premium brand chocolates were preferred to store brand chocolates by consumers and samples with 85% cocoa claimed on the label were significantly less preferred (Table 2).

Purchase intention scores followed the same trend as those obtained for the overall liking. More than 65% of consumers indicated that they would probably or definitively not purchase the samples with 85% cocoa (P3 and S3). Regarding the regular and Ecuadorian

Table 2
Overall acceptability mean values ($n = 109$) of chocolate samples evaluated under blind, expected and informed conditions by consumers.

Sample code	Brand	Type of product	Evaluation condition		
			Expected (E)	Blind (B)	Informed (I)
P1	Premium	Regular dark chocolate	6.87 ^a	6.78 ^a	7.12 ^a
P2	Premium	Ecuador cocoa dark chocolate	6.59 ^a	6.87 ^a	7.05 ^a
P3	Premium	85% Cocoa dark chocolate	6.46 ^a	4.06 ^b	4.37 ^c
S1	Store-brand	Regular dark chocolate	5.19 ^b	6.59 ^a	6.45 ^{a,b}
S2	Store-brand	Ecuador cocoa dark chocolate	5.16 ^b	6.61 ^a	6.14 ^b
S3	Store-brand	85% Cocoa dark chocolate	5.48 ^b	3.83 ^b	3.86 ^c

Means in the same column with different letters are significantly different ($\alpha = 0.05$).

cocoa chocolates, the percentage of consumers indicating that they would probably or definitively purchase this type of chocolate was more than 65% for the premium brand (P1 and P2) and 40% for the store brand (S1 and S2).

An internal preference map of consumer overall liking scores for the informed condition is shown in Fig. 3. The first two principal components (PC) explained 82.27% of the variability in the experimental data. The first PC clearly separated samples according to type of product (samples with 85% cocoa on the left and the remaining products on the right), while the second PC separates samples according to brand (premium samples on the top).

Most consumers were located to the right-hand side of PC1 in Fig. 3, showing that they disliked chocolate types with a high percentage of cocoa. A group of consumers that liked a high percentage of cocoa, but who disliked store brand chocolates are represented on the top, left-hand side of Fig. 3. This preference plot is quite different from that generated from the blind session scores, showing the impact of information on consumer liking values.

Comparison between expected, blind and informed liking scores

The extent to which sample overall liking is influenced by the expectations generated by information is usually studied by comparing average scores of each sample in the blind (B), expected (E) and informed conditions (I). For each sample, expected minus blind scores ($E - B$) and informed minus blind scores ($I - B$) were calculated and a paired t test was carried out to test significant differences between the mean ratings of the two conditions studied for each sample (Table 4).

Samples P1 and P2 showed no differences between expected and blind scores. Thus, expectations consumers had about these products fitted their sensory evaluations. For the remaining samples (P3, S1, S2 and S3), blind scores and expected liking scores were significantly different, indicating disconfirmation (mismatch between expectations and sensory evaluation). The two samples with high percentages of cocoa (P3 and S3) from both brands showed the largest differences between expected liking scores and blind scores. Differences in these samples were positive ($E > B$), indicating negative disconfirmation. Consumers expected these samples whose label claimed a high percentage of cocoa based to be better than when they were evaluated without information (blind condition).

Table 3
Two-way analysis of variance with interactions for acceptability data under blind, expected and informed conditions.

Factors	Acceptability					
	Expected condition		Blind condition		Informed condition	
	F-ratio	p-value	F-ratio	p-value	F-ratio	p-value
Brand	89.070	<0.0001	2.954	0.086	25.047	<0.0001
Type of product	0.394	0.675	185.992	<0.0001	153.624	<0.0001
Brand* type of product	1.993	0.137	0.025	0.975	0.714	0.490

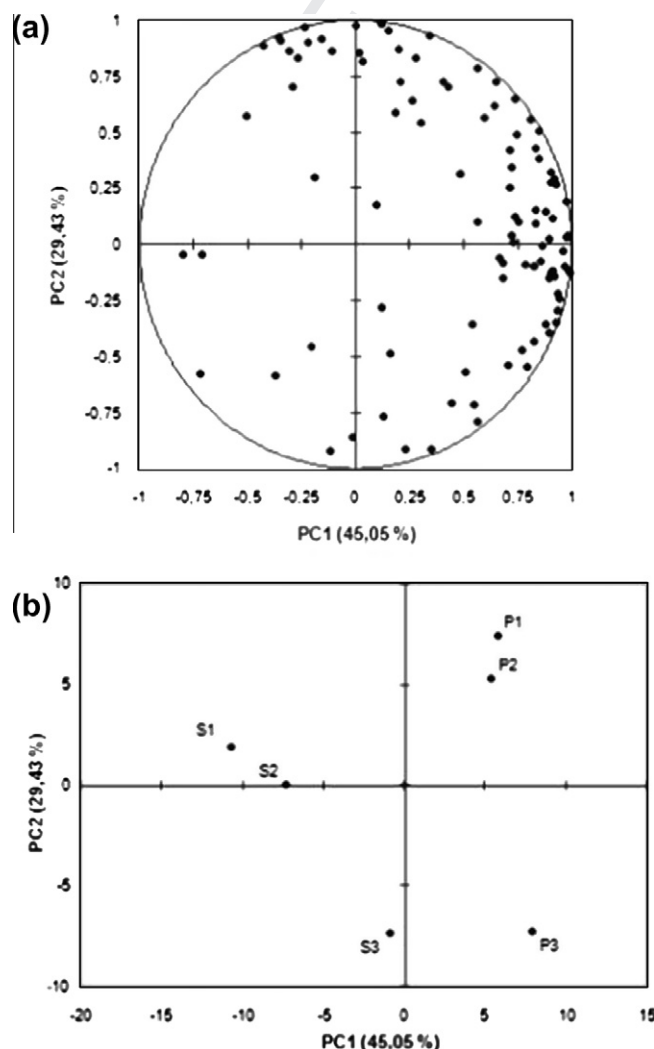


Fig. 1. Internal preference map of consumers' expected liking scores of the chocolates evaluated: (a) consumers' representation and (b) samples' representation. Samples identification: P = premium brand; S = store brand; 1 = regular dark chocolate; 2 = Ecuador cocoa dark chocolate and 3 = 85% cocoa dark chocolate.

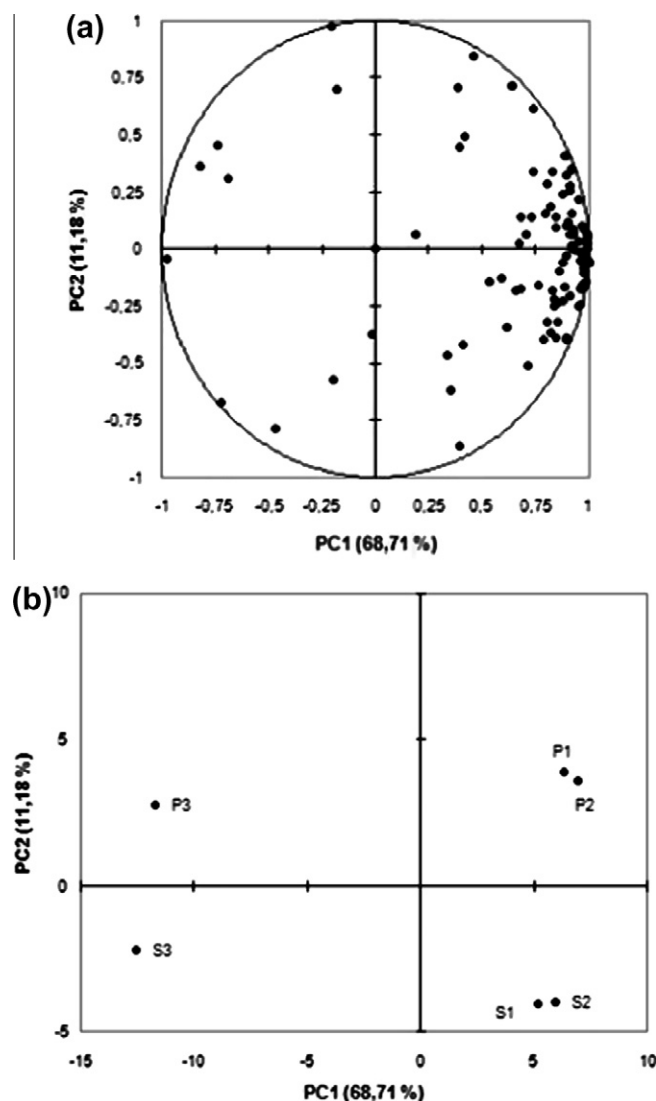


Fig. 2. Internal preference map of consumers' blind liking scores of the chocolates evaluated: (a) consumers' representation and (b) samples' representation. Samples identification: P = premium brand; S = store brand; 1 = regular dark chocolate; 2 = Ecuador cocoa dark chocolate and 3 = 85% cocoa dark chocolate.

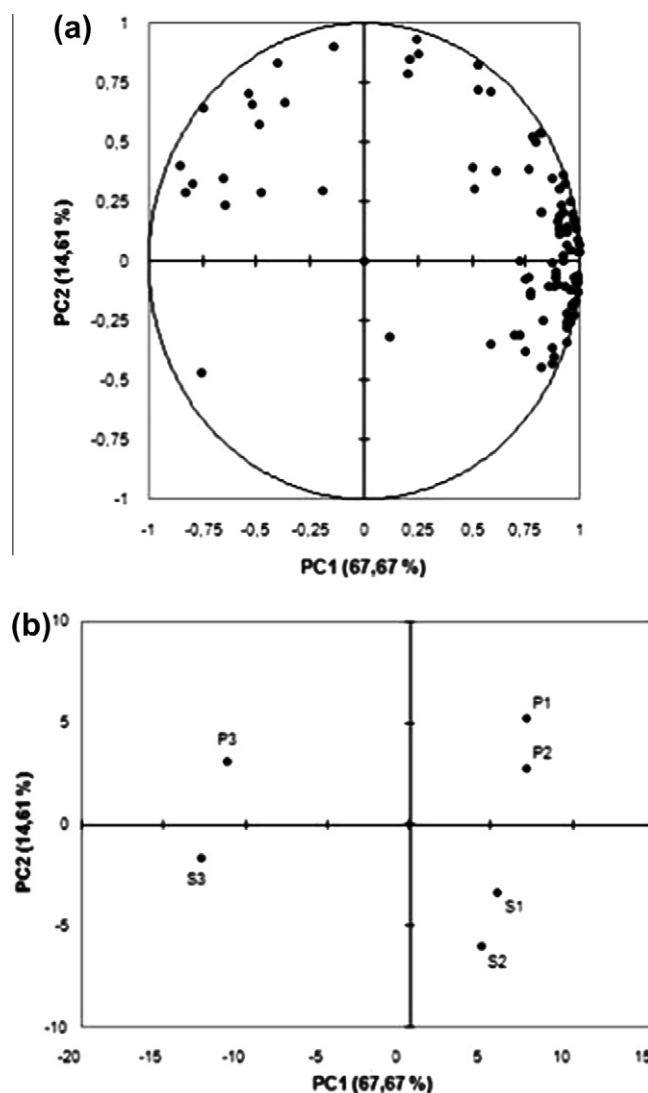


Fig. 3. Internal preference map of consumers' informed liking scores of the chocolates evaluated: (a) consumers' representation and (b) samples' representation. Samples identification: P = premium brand; S = store brand; 1 = regular dark chocolate; 2 = Ecuador cocoa dark chocolate and 3 = 85% cocoa dark chocolate.

For store brand samples S1 and S2, differences were negative ($E < B$), indicating positive disconfirmation. Under the expected condition consumers expected these products to be worse than when they were tasted in the blind condition.

From all of the studied samples, only in the case of sample S2 did informed liking scores differ significantly from blind ones, indicating that information affected informed acceptability scores. In such cases, two patterns can occur: $(I - B)/(E - B) < 0$ revealing a contrast effect or $(I - B)/(E - B) > 0$ indicating an assimilation effect. In this case, the quotient $(I - B)/(E - B)$ was higher than zero, indicating that this effect could be explained by the assimilation model. In cases where assimilation was detected, informed minus expected scores ($I - E$) were calculated to determine if complete product information assimilation had occurred, which would mean that consumer responses were determined mostly by the information provided by the product label and not by the sensory characteristics of the chocolates. In this case, the difference was significant ($M = 0.98$; $p < 0.001$) so assimilation was not complete (the expectancy was significantly higher than the informed acceptability), indicating that both the sensory hedonic dimension and the product information had an evident impact on the informed score.

In summary, the present study identified three types of information and its effects on product acceptability. In the case of dark chocolates with claims of a high cocoa percentage negative disconfirmation ($E > B$) was observed. Although the expected scores were high for these samples, when consumers tasted the products, the scores drastically decreased and remained low in the informed condition. Therefore, consumers could be initially interested in the product, but would purchase it only once because its sensory characteristics do not fulfill their expectations and because the claim of the high percentage of cocoa is not important enough to compensate the lack of sensory characteristics. This result also indicated that the preconceptions that the consumers had about chocolates claiming a high percentage of cocoa on the label did not correspond to the sensory characteristics of the product. This could be either because consumers did not pay attention to packaging information or because they were not aware of the sensory characteristics of dark chocolate with such a high cocoa percentage.

For samples from the premium brand (P1 and P2) there were no differences in liking scores between conditions, indicating that consumers clearly knew how much they would like these two products.

Table 4
Differences between mean acceptability values in blind (B), expected (E) and informed (I) condition tested through paired *t* test (*n* = 109).

Sample code	Brand	Type of product	E – B		I – B	
			<i>M</i>	<i>p</i>	<i>M</i>	<i>p</i>
P1	Premium	Regular dark chocolate	0.09	0.66	0.34	0.11
P2	Premium	Ecuador cocoa dark chocolate	–0.28	0.18	0.17	0.36
P3	Premium	85% Cocoa dark chocolate	2.39	<0.0001	0.30	0.30
S1	Store-brand	Regular dark chocolate	–1.39	<0.0001	–0.14	0.49
S2	Store-brand	Ecuador cocoa dark chocolate	–1.44	<0.0001	–0.47	0.04
S3	Store-brand	85% Cocoa dark chocolate	1.65	<0.0001	0.03	0.89

Consumers had high expectations for these products, which were fulfilled on tasting them. In this case, consumers would initially be attracted to purchasing the product and then they would confirm their acceptance of it by repurchasing.

In the case of store brand samples (S1 and S2), positive disconfirmation ($E < B$) was observed. Despite the low expectations, in blind conditions the samples were considered to be as acceptable as the premium brand chocolates. Similar results were obtained by Di Monaco, Cavella, Di Marzo, and Masi (2004) when evaluating the effect of expectations generated by brand name on the acceptability of dried semolina pasta (spaghetti). They found that store brand pasta generated the lowest expectations, but when consumers tasted the product it moved from the lowest liking group to the highest one. Thus, in the first instance, consumers would not be interested in buying these types of products, but if for any reason they tasted it, they would probably become more interested in it, considering that store brands usually offer lower prices. The response of consumers to the brands can also be explained in terms of consumer preferences for the quality guarantee that a familiar brand name or a premium brand brings, rather than the risks associated with buying from an unknown manufacturer brand or store brand (Baltas, 1997).

Regarding chocolates with claims of a single origin, consumers behaved as they did for the regular chocolates in the case of the premium brand, indicating that consumers did not give much importance to the origin of the chocolate and also did not consider that the product could be better. Furthermore, acceptance of both store brand and single origin products negatively affected expected and informed liking scores with respect to the blind condition. Claims on product labels about the geographical origin of chocolates have been shown to be a distinctive characteristic of high quality products. However, the results presented here indicate that consumers in this study did not perceive the claim about geographical origin as a positive feature for dark chocolate. This could be because this concept is quite new in the market and most consumers may not be familiar with this kind of information and with its impact on sensory properties.

From our results it can be concluded that consumers gave more importance to the sensory properties of the chocolates than to the label information, which could not counteract hedonic liking based on sensory experience. However, in studies with other types of products, such as soymilk beverages (Villegas et al., 2008) and powdered drinks (Varela et al., 2010), a complete assimilation effect was observed for information such as brand or type of product, indicating that consumer liking scores were dictated by their expectations. The differences in our results could be due to the different motivations that consumers have when consuming these types of products. Unlike soymilk and powdered beverages, chocolate is a craving product consumed mostly for pleasure, so consumer liking

scores are strongly based on what they perceive when tasting it and hardly affected by information.

Conclusions

The methodology used in this study proved valuable to gain insight into how claims on the label affect consumer expectations and acceptability of dark chocolate. The results obtained showed that acceptance for dark chocolates depended not only on the expectations generated by the information, brand and type of product, but mostly on the sensory characteristics of the products. Brand was an important factor in the consumer response to a chocolate product. For the premium brand dark chocolates, expectations were high and fulfilled by sensory characteristics of the products. Expectations were lower for store brand dark chocolates, but its sensory properties were good enough to minimise the negative effect of store brand information on acceptability. Claims about a high percentage of cocoa and single origin did not create higher expectations in these consumers compared to regular dark chocolates. Consumers did not like the sensory characteristics of chocolates with such a high percentage of cocoa (85%), and Ecuadorian origin was not appreciated by consumers as a feature that improves the sensory quality of dark chocolates.

These results confirm the importance of studying the effect of information on consumers' expectations and product acceptability in each particular case in order to understand consumer response to a new product feature. This methodology is a realistic approach, taking into account how much consumers like the sensory properties of a product and the preconception or knowledge consumers have about the sensory characteristics of a new feature.

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